

What is claimed is:

1. A measuring apparatus comprising:

a measuring unit having a transparent dielectric block,
a metal film formed on one of the surfaces of said dielectric
5 block, and a transparent dielectric film formed on said metal
film;

a light beam entering means for entering a light beam
into said dielectric block at various incident angles within
an angle range that satisfies the conditions of total reflection
10 at the interface between said dielectric block and said metal
film, and creates two or more dark lines due to attenuated total
reflections in a light beam totally reflected at said interface;

a light detecting means for receiving said light beam
totally reflected at said interface, and detecting positions
15 on a light receiving surface of said two or more dark lines
contained therein; and

a calculation means for calculating a variation in each
of said positions of said two or more dark lines on said light
receiving surface arising from a change in the dielectric
20 constant of a substance placed on said transparent dielectric
film with reference to one of said two or more dark lines having
the least positional variation on said light receiving surface
among said two or more dark lines, based on the output of said
light detecting means.

25 2. A measuring apparatus according to claim 1, wherein
said dark line having the least positional variation is a dark

line created by a light component of said light beam having the largest incident angle at said interface among said two or more dark lines.

3. A measuring apparatus according to claim 1, wherein
5 said measuring unit further comprises a sensing material fixed on said dielectric film, and said change in the dielectric constant is a change in said dielectric constant arising from a reaction when a test substance containing a material that reacts to said sensing material is brought into contact with
10 said sensing material.

4. A measuring apparatus according to claim 2, wherein said measuring unit further comprises a sensing material fixed on said dielectric film, and said change in the dielectric constant is a change in said dielectric constant arising from
15 a reaction when a test substance containing a material that reacts to said sensing material is brought into contact with said sensing material.

5. A measuring apparatus according to claim 1, wherein said metal film has a thickness of 10 nm to 70 nm, and said
20 transparent dielectric film has a thickness of 100 nm to 2000 nm.

6. A measuring apparatus according to claim 2, wherein said metal film has a thickness of 10 nm to 70 nm, and said transparent dielectric film has a thickness of 100 nm to 2000
25 nm.

7. A measuring apparatus according to claim 3, wherein

said metal film has a thickness of 10 nm to 70 nm, and said transparent dielectric film has a thickness of 100 nm to 2000 nm.

8. A measuring apparatus according to claim 4, wherein
5 said metal film has a thickness of 10 nm to 70 nm, and said transparent dielectric film has a thickness of 100 nm to 2000 nm.

9. A measuring apparatus according to claim 1, wherein
said transparent dielectric film is made of SiO_2 , a glass, or
10 plastic material.

10. A measuring apparatus according to claim 2, wherein
said transparent dielectric film is made of SiO_2 , a glass, or
plastic material.

11. A measuring apparatus according to claim 3, wherein
15 said transparent dielectric film is made of SiO_2 , a glass, or
plastic material.

12. A measuring apparatus according to claim 4, wherein
said transparent dielectric film is made of SiO_2 , a glass, or
plastic material.

20 13. A measuring apparatus according to claim 5, wherein
said transparent dielectric film is made of SiO_2 , a glass, or
plastic material.

14. A measuring apparatus according to claim 6, wherein
said transparent dielectric film is made of SiO_2 , a glass, or
25 plastic material.

15. A measuring apparatus according to claim 7, wherein

said transparent dielectric film is made of SiO_2 , a glass, or plastic material.

16. A measuring apparatus according to claim 8, wherein
said transparent dielectric film is made of SiO_2 , a glass, or
5 plastic material.